

PSENINI FROM NEPAL (HYMENOPTERA, SPHECIDAE)

by

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ABSTRACT

The Psenini collected by the Canadian Nepal Expedition in 1967 are discussed. The following new forms are described and illustrated: *Psen nitidus himalayensis* (♀); *Psen lobicornis* (♂); *Psenulus orinus* (♀ ♂); *Psenulus chillcotti* (♀ ♂); *Psenulus godavariensis* (♂); and *Psenulus birganjensis* (♂). Of *Psen rufoannulatus* Cameron and *Psen rufiventris* Cameron the males are described for the first time.

Through the kind mediation of Dr. Carl M. Yoshimoto I had the opportunity to study the Psenini collected by the Canadian Nepal Expedition of the Entomology Research Institute, Ottawa. The material belongs to the Canadian National Collection in Ottawa; a few duplicates are in the author's collection.

So far only *Psenulus bicinctus* Turner (1912) and *Psen nepalensis* Van Lith (1968) were recorded from Nepal, collected by the Bishop Museum, Honolulu (Van Lith, 1972) and by the East Nepal Expedition 1961-1962 of the British Museum (Natural History), respectively. The fresh material consists of 12 species and one subspecies, of which five species and the subspecies are new; *Psenulus bicinctus* was not represented on this occasion.

Most of the material was collected in Malaise traps. Dr. W. R. M. Mason, the hymenopterist of the expedition, kindly supplied me with most of the notes on the collecting localities and the habitat of the Psenini; a few data originate from G. W. Byers (1971).

- a. Adhabhar, near Simra, 600 ft, and
- b. Lothar, near Birganj, 450 ft; Simra and Birganj are in the lowlands of the Terai (S Nepal), grazed sal forest (*Shorea robusta*, a large gregarious tree) typical of the region. Fourteen specimens were collected here in August and September.
- c. Godavari, a village about ten miles SE of Kathmandu. The greater part of the material, viz. 25 specimens, were collected here at an altitude of 5000 and 6000 ft, in July and August, one male of *Psen rufoannulatus* in mid April.
- d. Pulchauki, 8000 ft, a mountain about ten miles SE of Kathmandu. *Psen rufiventris* was collected here early July.
- e. Patibhanjyang, near Kathmandu, a mountain district of steep pastures and terrace cultivation, a little above the limit of rice cultivation. A second male of *Psen rufoannulatus* was taken here at an altitude of 6000—7500 ft, in July, along the trails through the mountain pastures.
- f. Bhurumche, about 20 miles N of Kathmandu at an altitude of approximately 9000 ft, the last Sherpa village on the road to Gosaindkunde. The surroundings are cut over forest of the evergreen oak *Quercus semicarpifolia*. There is much secondary *Rhododendron* forest and many clearings are used for pasture. *Psen lobicornis* was collected here early in July.

g. The localities of the Malaise traps in which the five specimens of *Psenulus orinus* were found in May, are only given in latitude and longitude degrees. However, Dr. Mason, in his letter of May 30, 1972, gives interesting information on the peculiarities of the sites of these traps, viz. trap no. 5, 10,100 ft, 27°57' N, 84°59' E, SW of Kathmandu; trap no. 6, 10,500 ft, 28°00' N, 85°00' E and trap no. 7, 9900 ft, same latitude and longitude, NW of Kathmandu, as follows: "Malaise trap no. 5 was placed in a comparatively wet gorge (it was the dry season) occupied by a small stream flowing over shale bedrock. The exposure was north and the forest consisted of *Tsuga*, *Abies*, *Acer*, *Corylus*, *Rhododendron* and dwarf bamboo. Traps no. 6 and no. 7 were set near together on a steep slope with northern exposure. The forest on north facing slopes is quite different from that on slopes facing in the other three directions. Although it was dry season the ground was very wet and consisted of a tangled and slippery mass of roots and vines, very difficult to walk in. The forest consisted mostly of *Rhododendron* with a few *Abies* still remaining. It would undoubtedly have been a pure *Abies* forest but for the logging activities of the local people. At the lower trap, no. 7, there were in addition many deciduous trees, such as *Quercus*, *Acer*, *Prunus* and *Daphne* as well as *Tsuga*, dwarf bamboo and numerous vines, mostly *Clematis*. I am told that these steep north facing slopes hold the snow in winter because the lower altitude of the sun does not strike them and melt the snow as it does on other exposures. Because of the superior moisture holding ability of the north slopes and also because they do not burn readily in the dry season the insect fauna seems to be much richer."

No other *Psenini* were collected in these three traps, but this may be due to the early time of the year.

Together with a female of *Psen rufoannulatus* from Kathmandu, 4400 ft, a total of 48 specimens is reached, a very satisfactory result. In this paper I have also included the allotype of *Psen rufiventris*, from Simla, which is in the British Museum collection and a female of *Psenulus chillcotti*, of the B.M. Nepal Expedition, 1954.

My thanks are due to the authorities of the Canadian National Collection, to Dr. W. R. M. Mason, who kindly authorized me to publish his notes on the habitats, and to Dr. Carl M. Yoshimoto, both of the Entomology Research Institute, Ottawa. I am also much obliged to the authorities and staff of the British Museum (Natural History), London, and of the Oxford University Museum, who enabled me to compare the material with types in their collections.

***Psen (Psen) nepalensis* Van Lith**

Van Lith, 1968: 103—104, ♀ (E Nepal).

New record from Nepal: 1 ♀, Kathmandu, Godavari, 5000 ft, 15 July, 1967.

This specimen has been compared with the holotype, collected in 1961 by the B.M. Nepal Expedition. Thorns on hind tibiae somewhat brownish, whitish in the type. Punctuation of scutum in both specimens dense and deep, punctures often in rows, interstices between rows often larger than diameter of punctures. Punctures on frons much deeper than in *P. emarginatus* Van Lith from Java, to which form it is closely related.

Long hairs on hind margins of tergites rather fine, much worn in some places.

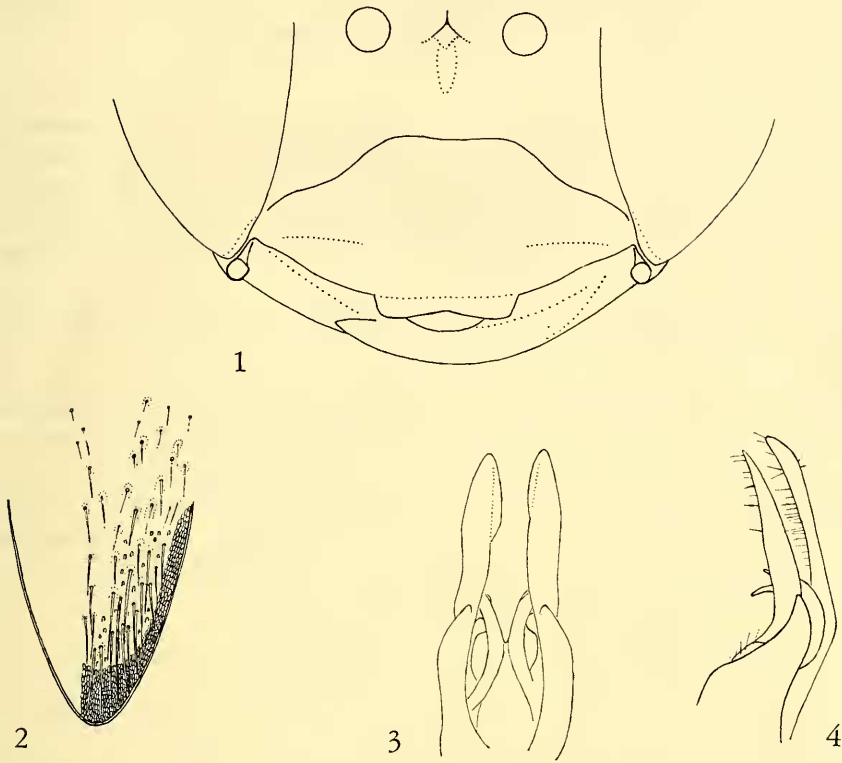


Fig. 1—4. *Psen rufoannulatus* Cameron. 1, face, ♀; 2, pygidial area, ♀; 3, ♂ genitalia, dorsal aspect; 4, the same, lateral aspect

***Psen (Psen) rufoannulatus* Cameron**

Cameron, 1907: 90, ♀ (N India: Simla).

Van Lith, 1965: 58—60.

This species was known only from the holotype from Simla. Fortunately the Canadian Expedition collected not only two females, but also two males.

Female. — Gaster slightly redder than in holotype: first two gastral tergites completely dark red, moreover base of third tergite laterally, ventral plate of petiole, second sternite and basal half of third sternite red. Fore basitarsi brown, following four segments yellowish-brown, mid tarsi completely, and apices of hind tarsal segments, yellowish-brown.

Vertex and scutum finely punctate, interstices mostly a few times larger than punctures. Second recurrent vein of fore wings ending in third submarginal cell, almost interstitial. Petiole about six or seven times as long as wide in the middle, rounded below, dorsally flattened, lateral carinae indistinct.

Face (Fig. 1) with silvery appressed pubescence and long erect white hairs. Petiole with usual outstanding lateral hairs. Tergites and sternites with dense short whitish pubescence; also with longer hairs, densest on apical part. Tergites 2—5 just before the

bare hind margin with fringe of long fine white hairs, from both sides directed inwards and their tips slightly curved. Pygidial area with long, backwards-directed, whitish bristles (Fig. 2).

Length, 10.5 mm.

Male. — Darker than female, only first tergite, two lateral spots on second tergite, ventral plate of petiole and second sternite laterally dark red. Mid tarsi brown.

Antennal segments 5—12 with broad oval tyloidea, distinctly concave on segments 6—10. Second recurrent vein of fore wings interstitial. Genitalia light brown, volsellae dark brown; stipites long and narrow, on inner side with small and narrow squamae (Fig. 3 and 4).

Pubescence of gastral segments as in female, apical margins of third and fourth sternites medianly with tuft of long yellowish-white hairs.

Length, 8—8.5 mm.

Nepal: 1 ♀, Kathmandu, 4400 ft, 28 April, 1967; 1 ♀, Kathmandu: Godavari, 5000 ft, 23 July, 1967; 1 ♂, Kathmandu: Godavari, 5000 ft, 15 April, 1967; 1 ♂, Kathmandu: Patibhanjyang, 6000—7500 ft, pastures, 3 July, 1967.

The fringes of long hairs on the posterior margins of the tergites are not conspicuous, but in both sexes distinctly present. Moreover the tyloidea of the male antennae resemble those of *P. dzimm* Tsuneki and *P. pilosus* Van Lith. Therefore I now consider *P. rufoannulatus* as belonging to the group of *P. emarginatus*.

Psen (*Psen*) *nitidus* himalayensis subsp. nov.

Two females, recorded below, differ from the nominate subspecies by the paler antennae and legs.

Tip of scape of antennae, pedicel and underside of the whole flagellum yellowish-brown. Dorsal side of flagellum dark brown, but apex of last segment somewhat paler.

Fore tibiae yellowish-brown, on outer side slightly infuscated. Basal third of hind tibiae yellowish-brown. Tarsi pale yellowish.

In *P. nitidus* from Java the underside of the flagellum is only slightly paler than the upper side and the tibiae are distinctly darker.

Nepal: 1 ♀ (holotype), near Simra, Adhabhar, 600 ft, 23—28 Aug., 1967, Malaise trap No. 22; 1 ♀ (paratype), near Birganj, Lothar, 450 ft, 5—12 Sept., 1967.

Psen (*Psen*) *rufiventris* Cameron

Cameron, 1890: 267—268, ♀ (*Psen rufiventris*; India, Madras).

Van Lith, 1965: 34—35 (*Psen* (*Psen*) *rufiventris*).

First description of male. — Head and thorax black with some metallic reflection; anterior margin of clypeus brownish, labrum yellowish-red, mandibles yellowish-red with dark red tips, palpi pale yellow. Scape of antennae reddish, upper side more brownish, flagellum dark brown above, yellowish-brown beneath. Pronotal tubercles, tegulae and veins of wings dark brown. Legs including trochanters reddish, fore side of fore tarsi dark brown, fore and mid femora slightly darkened above and below, hind femora and tibiae brownish above, hind tarsi except apices of segments darker brown. Tibial spurs of fore and hind legs yellowish-white.

Petiole and tergites 1—4 dark brown, base of second tergite laterally with pale red

spot, margin of fourth tergite reddish-brown, sides and apical margin of fifth tergite reddish, sixth and seventh tergites pale red. Ventral plate of petiole and second sternite reddish, following two sternites reddish-brown with paler margin, fifth and sixth sternites yellowish-red.

Clypeus swollen, with median depression on lower half. Anterior margin with wide emargination (Fig. 5). Frons swollen, head in frontal aspect as long as broad, postocellar area not distinctly raised. Frons superficially punctate, vertex almost smooth. Fine frontal carina, ending between antennae in a shining tooth. Genae and tempora smooth and shining. Mandibles normal. Scape of antennae thick, about twice as long as broad, more than one and a half times as broad as third segment. Third segment in frontal aspect about two and three quarters times as long as broad at apex, fourth segment about twice, following segments about one and a half times as long as broad at apex, last segment about twice as long as broad at base. Segments 5—6 convex below, following segments with slightly concave basal half and convex apical half. Segments 4—12 with distinct oval tyloidea, nearly as long as segments, sculpture little different from remainder of segment, tyloides on last segment indistinct.

Scutum with fine punctures, interspaces often larger than diameter of punctures, punctuation medianly on apical half sparse. Scutellum and metanotum convex, with a few punctures. Propodeum with distinct horizontal and vertical part. Enclosed area long, with oblique longitudinal carinae, horizontal part behind enclosed area smooth. Back of propodeum with narrow median longitudinal groove and coarse reticulate carination except an almost unsculptured heart-shaped area, bordered by a high carina and with a few transverse carinae, on its upper half. Fore part of sides of propodeum smooth, apical half finely reticulate, sides and back separated by a fine curved carina. Mesopleura, metapleura and hypo-epimeral area smooth and shining. Anterior plate of mesepisternum indistinctly punctate. Anterior oblique suture narrow, widened upper part with a few fine transverse carinae. Epicnemial area smooth and shining, ventro-laterally curved forward, lateral epicnemial carina and precoxal carina extraordinarily high, forming a lobe when viewed from behind and, in frontal view, an extension of the epicnemial area. Subpleural signa indistinctly connected with precoxal carinae and hind margin of mesosternum, within this area fine superficial punctures and along the median carina a few long, irregular longitudinal carinae. No acetabular carina, only some fine transverse striae. Metasternum deeply emarginate posteriorly and with two high, oblique, lateral carinae.

First recurrent vein of fore wings ending in second, second recurrent vein ending well in third submarginal cell. Fore femora triangular, broadest part almost half the length of femora, fore basitarsus slightly bent, smooth and nearly bare, longer than following four segments together. Fore tibiae, mid femora and mid tibiae thick, mid basitarsus somewhat curved and at least as long as following four segments. Hind trochanters angular beneath, hind femora and tibiae very long and slender, hind basitarsus about as long as following three segments together. Mid tibiae without usual long apical spurs.

Petiole cylindrical and slender, with small depression dorsally at apex, more than twice as long as first tergite, about ten times as long as wide in the middle. First two gastral tergites smooth and almost impunctate, third tergite smooth, with distinct punctures on basal half, following tergites finely reticulate, sparsely punctate, margins impunctate.

Ventral plate of petiole and second sternite smooth, following sternites very finely aciculate; basal half of fourth sternite, which may be partly hidden, very smooth and shining. This smooth part bordered posteriorly by a narrow area which does not reach the lateral margins and is covered with extremely fine punctures, each bearing a fine short hair. Apical spine long.

Face below antennae with silvery and appressed short pubescence, but also with unusually dense pubescence of long, whitish, erect hairs with ends curved downwards. Frons with short, inconspicuous, pubescence, tempora and genae with short appressed silvery pubescence and a few long hairs, vertex with long brownish hairs. Scutum with short brownish pubescence, scutellum and metanotum with long erect brown hairs, mesosternum with dense short whitish pubescence, propodeum with long white hairs, petiole with relatively short and fine latero-ventral erect hairs, gaster very sparsely pubescent. Last gastral tergites before hind margin with a few long stiff hairs. Ventral side of gaster sparsely pubescent, only third sternite medianly at apex with tuft of long, dark brown, bent hairs, following sternites with a few stiff long hairs before apical margin, seventh sternite with dense and short pubescence. Upper two-thirds of back of hind femora bare.

Genitalia (Fig. 6, 7 and 8) large, pale yellowish-brown, including volsellae; stipites thin and easily crumpled.

Length, 11.5 mm.

North India: 1 ♂ (allotype), Simla, 30 August, 1918, Brunetti Coll., B.M. 1927—184 (BM).

Nepal: 1 ♂, Kathmandu, Pulchauki, 8000 ft, 21 July, 1967, Canadian Nepal Expedition (CNC).

This male differs from that from Simla only in the gaster being somewhat more reddish. The second tergite is red with brownish hind margin, the third brown with a broad reddish hind margin, the fourth tergite reddish with a small brown spot on base, the fifth tergite reddish with only a slightly darkened small basal spot, the following segments are completely reddish.

This peculiar form differs from other *Psen* by the raised clypeus in both sexes, the shape of the legs and the strongly developed epicnemial and precoxal carinae in the male. I could compare this material with the single female (holotype) of *Psen rufiventris*, in the collection of the Oxford University Museum. Although there are some differences, the male having higher epicnemial and precoxal carinae and the head, in frontal view, being higher (female Fig. 9), there is little doubt that the material is conspecific. More specimens of both sexes from the three localities, Madras, Simla and Kathmandu, would be very welcome.

Psen (Psen) simlensis Van Lith

Van Lith, 1968: 119—120, ♀ (N India).

Nepal: 4 ♀, Kathmandu, Godavari, 6000 ft, 14—17 July and 7—17 Aug., 1967.

These females are identical with the type from Simla. All have the extreme apex of the pygidial area reddish, which was not mentioned in the original description. *P. simlensis* belongs to the group of *P. orientalis* Cameron, which has many representatives distributed over a large area, including palaearctic East Asia.

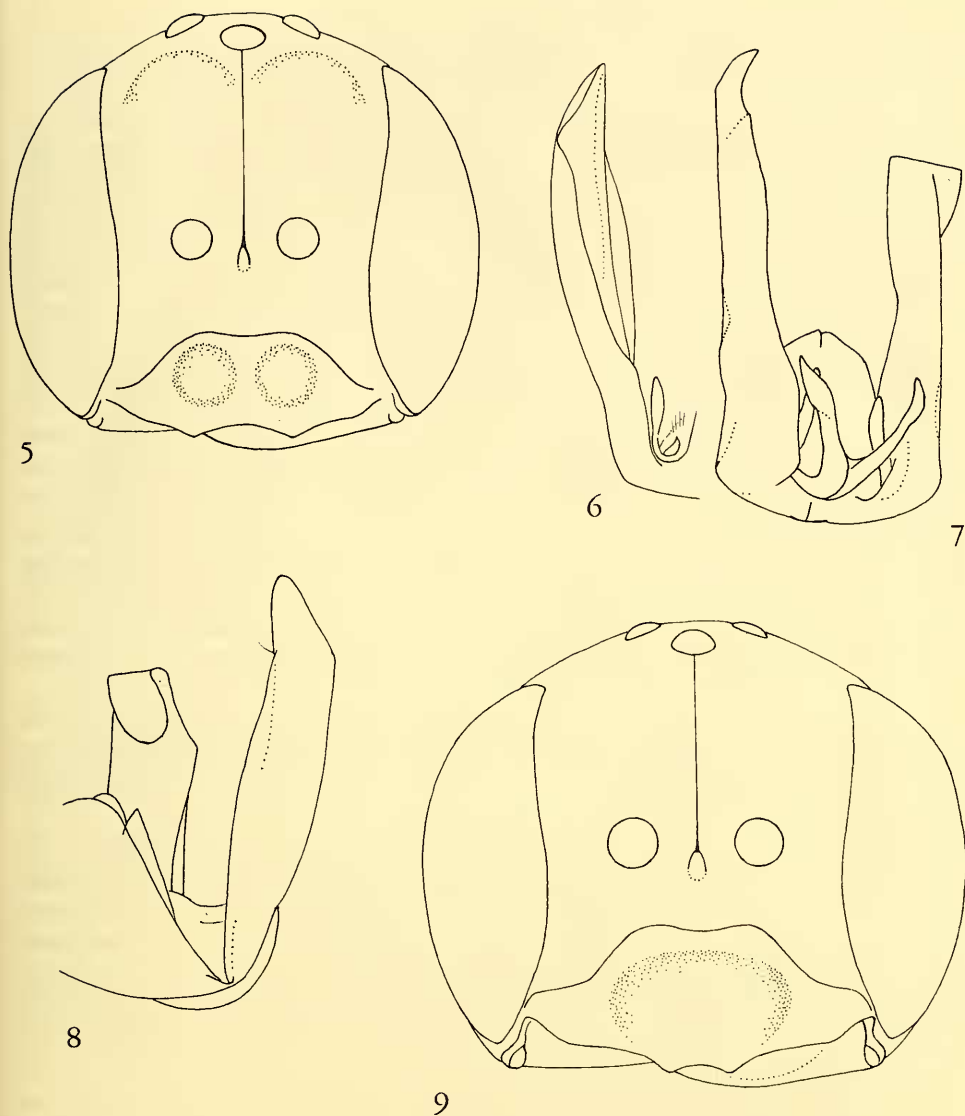


Fig. 5—9. *Psen rufiventris* Cameron, ♂ from Nepal, ♀, holotype, from Madras. 5, face, ♂; 6, right part of ♂ genitalia, latero-dorsal aspect; 7, ♂ genitalia, dorsal aspect; 8, the same, ventral aspect; 9, face, ♀

***Psen (Psen) lobicornis* spec. nov.**

Male. — Black, head and thorax with somewhat leaden gloss; tips of mandibles, palpi and tarsal claws brown. Apical spurs of tibiae light brown, apical spine brown.

Protruding median part of clypeal margin smooth and shining, broad triangularly emarginate (Fig. 10), disk of clypeus superficially punctate. Fine frontal carina, ending in a short and raised angular carina between antennae (Fig. 10). Frons with fine and

dense punctation, near oculi almost smooth, vertex also with fine punctation, densest around ocelli, where punctures often are placed in rows. Tempora and genae smooth and shining. Antennae (Fig. 11) long, scape large, about two and a half times as thick as third antennal segment at base (Fig. 10), third segment about three times as long as broadest part (in frontal aspect, when convexity is best visible), fourth segment about twice as long as broad in the middle, following segments gradually shorter, twelfth segment hardly convex, less than twice as long as broad in the middle, last segment about three times as long as broad at base. Segments 3—13 with distinct tyloidea, on third segment small, near apex, on segments 4—11 large, elliptic and medianly much raised so that these segments are strongly convex below, on segments 12—13 much narrower.

Scutum with fine but deep punctures, interspaces once or twice diameter of punctures, puncturation denser on posterior margin. Scutellum and metanotum less densely punctate. Enclosed area of propodeum about equitriangular, with eight longitudinal carinae; horizontal part of propodeum behind this area smooth, back of propodeum with strong, irregular carination, sides of propodeum with a few weaker carinae. Epicnemial areas, mesopleura including hypo-epimeral areas, and metapleura smooth and shining, very finely punctate; mesosternum with fine widespread punctures and median longitudinal carina with a few short, strong, transverse carinae. Anterior oblique suture foveolate, widened upper part with a few transverse carinae. Legs normal, slender, hind tibiae with a few short thorns on outer side. First recurrent vein of fore wings ending well in second submarginal cell, second recurrent vein ending in third submarginal cell near second cell.

Petiole longer than twice first tergite, at least eight times as long as wide in the middle, dorsally slightly rounded, apically with small deep pit, sides slightly depressed with two unsharp longitudinal carinae, ventrally rounded. Gaster shining, extremely finely punctate, apical spine long.

Face below antennae with appressed silvery pubescence and long erect whitish hairs, outer side of mandibles with long greyish hairs, frons with greyish-brown pubescence, long near oculi and on vertex. Thorax with appressed short and erect long pubescence, greyish-brown on scutum, more whitish below. Underside of fore and mid femora and back of hind femora with long whitish hairs, inner side of hind femora bare. Petiole with usual long and outstanding, pale, hairs. Pubescence of gaster short, brown, sparse, before apical margin of sternites a few long stiff hairs. Third and fourth gastral sternites with median tuft of long brown hairs.

Genitalia dark brown, long and slender, with rather long, transparent, inner squamae, apices of stipites with long brown hairs, bent at their apex (Fig. 12 and 13).

Length, 9 mm.

Female unknown.

Nepal: 1 ♂ (holotype), Bhurumche, near Kathmandu, 8500—9500 ft, oak forest, 1 July, 1967.

P. lobicornis belongs to the group of *P. orientalis* Cameron and is characterized by the strongly convex underside of the tyloidea. Probably it is closely related to *P. fuscinervis* (Cameron), which has linear tyloidea. The male of *P. simlensis* is still unknown, but its female has a more cylindrical petiole, an almost smooth vertex and finer punctate scutum.

***Psenulus orinus* spec. nov.**

Female. — Black; palpi dark brown, tibial spurs paler brown. Veins of wings black.

Clypeus slightly convex, densely but superficially punctate, margin medianly with about semi-circular emargination between two strong triangular teeth. Face (Fig. 14) above clypeus also with dense superficial punctures, centrally between clypeus and transverse carina, a shallow oval depression. Fine frontal carina, between antennae ovally broadened and excavate (Fig. 15), ending below antennae in a rectangular transverse carina (reversed V). Frons on both sides of carina slightly convex, very densely finely punctate, vertex shining, sparsely finely punctate. Occipital carina normally ending in hypostomal carina. Apex of mandibles bidentate. Antennae gradually thickening towards apex, third segment about three times, fourth and fifth segments about twice, segments 7—9 about one and a half, segments 10—11 about one and a third times as long as broad at apex, twelfth segment slightly more than twice as long as broad at base.

Scutum finely, distinctly, punctate, interstices often a few times diameter of punctures. Scutellum and metanotum sparsely, indistinctly, punctate. Enclosed area of propodeum rather narrow, pentagonal median part with indistinct median carina. Back of propodeum almost smooth, only very fine hair-bearing punctures and with deep median longitudinal groove. Propodeum latero-dorsally with broad foveolate groove, apex with some irregular carinae; posterior half of sides with indistinct carination. Epicnemial areas, mesopleura, metapleura and mesosternum almost smooth, shining. First recurrent vein of forewings interstitial, second recurrent vein ending just in third submarginal cell, upper side of second submarginal cell about two-fifths of bottom of cell. Legs normal.

Petiole (Fig. 16) long, about as long as first two gastral tergites and somewhat longer than half the length of the thorax, almost cylindrical, sides with a row of superficial large punctures, dorsally at base with lateral sharp carina, medianly a deep longitudinal groove, which is broad basally, tapers towards apex and ends in a triangular pit. Gaster shining, very finely sparsely punctate, last tergites and all sternites finely alutaceous, second sternite with indistinct triangular depression at base. Pygidial area elongate-triangular, narrowed towards apex, lateral carinae distinct (Fig. 17).

Face with short silvery pubescence, hardly appressed and therefore not concealing sculpture of clypeus, and with long whitish hairs intermixed. Head, thorax and legs whitish-pubescent, densely on mesosternum. Petiole with usual long, outstanding, whitish hairs. Pubescence of gaster brown, dense and short on posterior margins of fourth and fifth sternites, sixth sternite with dense backwards-directed golden-brown pubescence.

Length, 7.5 mm.

Male. — Resembling female. Carina between antennae less broadened (Fig. 19), transverse carina longer, bilobed, laterally bent upwards to outer side of antennal sclerites, anterior margin of clypeus more triangularly emarginate, teeth smaller (Fig. 18). Antennae longer, third segment about two and a half times, segments 4—12 slightly more than twice as long as broad at apex, last segment about two and a half times as long as broad at base. Segments 3—11 with long, oblique, narrow carina-like tyloidea, on twelfth segment reduced to a very short carina or point.

Petiole somewhat longer (Fig. 20), with distinct keel also ventrolaterally at base, sides slightly depressed. First recurrent vein of fore wings variable, in three males interstitial, in one male distinctly ending in first submarginal cell and in one male ending well in second submarginal cell. Apex of seventh gastral sternite: Fig. 23.

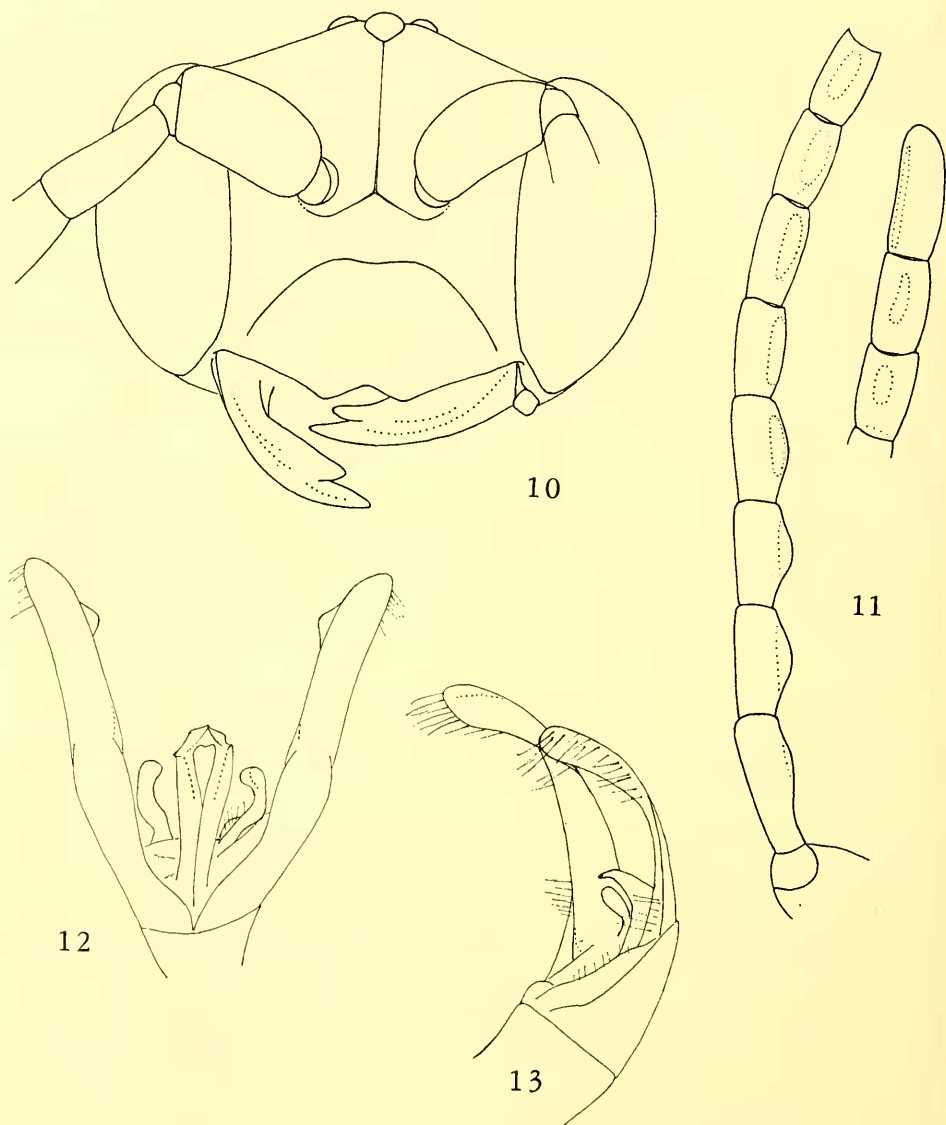


Fig. 10—13. *Psen lobicornis* sp. nov., ♂, holotype. 10, face; 11, antenna; 12, genitalia, dorsal aspect; 13, the same, lateral aspect

Genitalia pale straw-yellow, stipites with small semi-circular inner emargination and distinct inner tooth (Fig. 21 and 22).

Length, 7 mm.

Nepal: 1 ♀ (holotype), 28°00' N, 85°00' E, Malaise trap 7, 9900 ft, 21—27 May, 1967, 2 ♂ (allotype and paratype), 27°57' N, 84°59' E, Malaise trap 5, 10,100 ft, 26—31 May, 1967, 2 ♂ (paratypes), 28°00' N, 85°00' E, Malaise trap 6, 10,500 ft, 4—12 May and 21 May 1967.

Psen montanus Cameron (1907) is very similar and certainly closely related. It has also distinct clypeal teeth, a transverse carina below the antennae, a triangular pygidial area and its face is little pubescent. However, its palpi are pale brown, the antennal segments are much shorter and the punctation of the scutum is more dispersed. This species will be discussed in a separate paper. Its name is preoccupied by *Psen montanus* Ach. Costa, 1868, of which the type seems to be lost but which according to the description might be identical with *Psenulus atretus* Pz. (cf. de Beaumont, 1937: 87).

Psenulus quadridentatus Van Lith

Van Lith, 1962: 37—38, ♀ and ♂ (Malaya).

Van Lith, 1972: 162, ♀ (Vietnam).

Nepal: 4 ♀, 17—25 July, 1967 and 4 ♂, 17—22 July, 30 July and 7—13 Aug., 1967, Kathmandu, Godavari, 6000 ft, in Malaise traps.

In the females, as in the holotype from Malaya, the pronotum is dorsally somewhat reddish transparent, covered with rather dense whitish pubescence.

Pronotum in males darker, but not fully black. Underside of antennal segments 1—5 yellowish-brown, following segments partly darkened, especially segments 8—10. Although the tyloidea of the antennae are little raised, they are, when examined under the right angle, well visible and not really indistinct, as I stated in the original description. On segments 4—6 they are large, reddish-brown and oval, on the seventh segment much smaller, reduced to a point on the eighth segment, and hardly visible on the ninth segment. Sometimes there is also a small shining point on the third segment. Segments 5—12 distinctly rounded below.

Genitalia (Fig. 24 and 25) pale straw-yellow, including volsellae. Apical spine dark brown. Apex of seventh gastral sternite: Fig. 26.

Psenulus chillcotti spec. nov.

Female. — Head and thorax black; labrum and median part of mandibles reddish, palpi pale straw-yellow. Upper side of antennae dark brown, underside of scape and pedicel, and base and apex of flagellum more or less orange-red; in one female complete underside of flagellum orange-red. Posterior margin of pronotal tubercles more or less brownish, tegulae brownish. Fore and mid tibiae and tarsi yellowish, fore and mid femora, except upper side of apex largely dark brown, trochanters dark brown. Hind tibiae, femora and trochanters reddish, femora dorsally sometimes brownish darkened; hind tarsi, except extreme apices of segments, dark brown. Veins of wings dark brown. Gaster, including petiole, yellowish-red.

Protruding median part of clypeal margin with two large, shining, triangular teeth (Fig. 27), distance between teeth about one seventh of total distance there between eyes. Disk of clypeus opaque, very finely and densely punctate, also rest of face below transverse carina. Fine frontal carina, raised and broadened between antennae (Fig. 28), ending in an angular, short, transverse carina below antennae. Frons and vertex shining, frons densely but superficially punctate, vertex with fine scattered punctures, a few larger punctures between posterior ocelli. Antennae short, gradually thickening towards apex, third segment about twice as long as broad, following segments gradually shorter, segments 8—11 shorter than broad, last segment more than one and a half times as long as broad at base. Mandibles normally bidentate at apex.

Scutum with irregular punctation, very fine and dense between median scutal lines, on rest of scutum very fine, mixed with much larger punctures; scutum centrally more shining, with interstices a few times diameter of punctures; posterior margin with short longitudinal striae. Prescutal sutures about three quarters of length of scutum but superficial. Scutellum and metanotum scarcely and finely punctate. Enclosed area of propodeum with about twenty short oblique carinae, area between median carinae pentagonal, upper part of back of propodeum smooth and shining, lower four-fifths minutely punctate. Median longitudinal groove narrow, upper part widened and with a few transverse carinae, between back and sides of propodeum a broad, curved, foveolate groove; posterior half of sides of propodeum with fine irregular striae, anterior half smooth. Epinemial areas, anterior plate of mesepisternum, mesopleura and mesosternum shining, only with minute hair-bearing punctures. Metapleura smooth and shining. Anterior oblique suture narrow, foveolate, widened upper part with a few transverse carinae. Legs normal, slender. First recurrent vein of fore wings ending just in second submarginal cell, second recurrent vein in third submarginal cell, distance from second cell about one fifth of length of bottom of cell. Petiole about as long as hind femora, at apex nearly twice as broad as at base (Fig. 29), almost cylindrical, dorsally more flattened with a small depression at apex, sides on apical half densely punctate. Tergites very finely punctate, apical margins smooth, sternites somewhat stronger punctate. Pygidial area distinct, small and narrow, finely punctate, lateral carinae almost parallel (Fig. 30).

Face with appressed silvery pubescence and also with many long erect silvery hairs, head and thorax with whitish pubescence, on mesosternum dense and short and also with long, whitish, hairs, epinemial areas below with round patch of appressed and dense, yellowish-silvery pubescence. Fore and mid femora below with long whitish hairs. Gaster with short yellowish pubescence, margin of fourth and fifth gastral sternites with dense, short, white pubescence, sixth sternite with dense, backwards directed, golden pubescence.

Length, 8 mm.

Male. — Resembling female. Dorsal side of fore and mid femora almost completely yellowish-red, mid tibiae slightly darkened. Hind legs, including trochanters, reddish-brown, tarsi brown. Underside of antennae orange-red, in one male segments 6—9 more or less brownish.

Transverse carina below antennae longer, laterally bent upwards to reach outer sclerites of antennae. Antennae moniliform, segments 3—12 about one and a half times as long as broad in the middle, last segment slightly more than twice as long as broad at base. Segments 3—7 with narrow tyloidea, broadened towards apex, segments 8—11 with gradually shorter, elongate-oval, tyloidea, on twelfth segment reduced to a small point.

Upper half of back of propodeum as in female, lower half with transverse irregular carinae; posterior half of sides of propodeum with coarse, irregular, reticulate carination. Genitalia brownish-yellow (Fig. 32 and 33). Apex of seventh sternite: Fig. 31.

Length, 7—8 mm.

Nepal: 1 ♀ (holotype), 6000 ft, 23—25 July, 1967, 1 ♂ (allotype), 6000 ft, 27—30 July, 1967, Kathmandu, Godavari. Paratypes, all from the same locality: 3 ♀, 6000 ft, 19—20, 23—26 and 27—30 July, 1967; 2 ♀, 5000 ft, 27—30 July, 1967; 2 ♂, 6000 ft, 17—20 July, 1967. All, 2 ♀ excepted, collected in Malaise traps.

The male is very similar to *P. bengalensis* (Van Lith, 1972), which is known only from the holotype. The latter species differs in the following details: postero-lateral

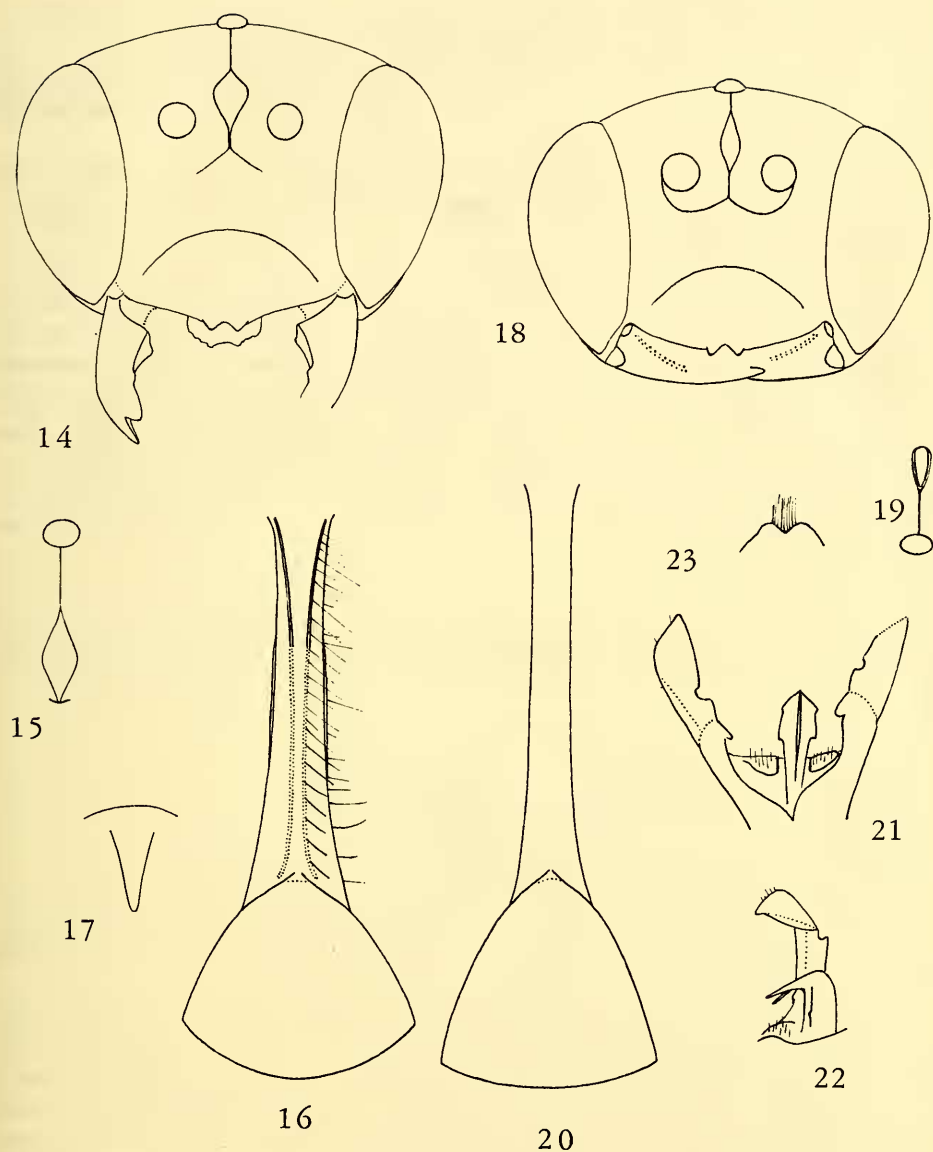


Fig. 14—23. *Psenulus orinus* sp. nov., ♀, holotype, ♂, paratype. 14, face, ♀; 15, median ocellus and interantennal carina, dorsal aspect, ♀; 16, petiole and first tergite, ♀; 17, pygidial area, ♀; 18, face, ♂; 19, median ocellus and interantennal carina, dorsal aspect, ♂; 20, petiole and first tergite, ♂ (sulcus and hairs omitted); 21, ♂ genitalia, dorsal aspect; 22, the same, left stipes and penis valves, lateral aspect; 23, apex of seventh sternite, ♂

groove of propodeum superficial only and sides of propodeum smooth; petiole narrower, apex at most one and a half times as broad as base; stigmata of first tergite protruding. Moreover the antennae of *bengalensis* are much darker and the tyloidea on the twelfth segment is more distinct and larger than in *P. chillcotti*.

P. chillcotti belongs to the group of *P. quadridentatus*. The female resembles that of *P. macrodentatus* Van Lith, from Sumatra, but differs in having smaller clypeal teeth, more shining vertex between ocelli and oculi, more coarsely punctate scutum, larger transverse carina below antennae, a curved dorso-lateral groove on the propodeum, darker pronotal tubercles and darker legs.

This species is dedicated to the late Dr. James Gordon Thomas Chillcott, who organized and at first led the Canadian Nepal Expedition, but unfortunately died in Nepal on 20 April, 1967.

A male, collected 3 Aug., 1967, at the same locality, also in a Malaise trap, differs considerably from the three males described above. The coarse punctures on the scutum are completely lacking. Furthermore the tyloidea are only present on antennal segments 3—8 (right antenna) or 3—9 (left antenna), and are of a different shape, much broader, especially on segments 3—6. The squamae of the genitalia are somewhat broader (Fig. 34). The latero-dorsal groove of the propodeum is indistinct. The first recurrent vein of the fore wings ends in the first submarginal cell. However, I do not exclude the possibility that it is an aberrant male of *P. chillcotti* and cannot describe it as a distinct species without further material.

In the British Museum (Natural History), London, is a female from Nepal, which, although it has no gaster, is considered identical with *P. chillcotti*: Ghanpokhara, 5500—7000 ft, 2 May, 1954, coll. J. Quinlan, B.M. Nepal Expedition, B.M. 1954—540.

Psenulus puncticeps (Cameron)

Cameron, 1907: 91, ♀ (*Psen puncticeps*; India: Bombay, not Simla).

Rohwer, 1923: 595—596, ♂ (*Diodontus antennatus*; Singapore).

Van Lith, 1962: 44—46, ♀ and ♂ (*Psenulus antennatus*; Malaya, Java, Bali).

Nepal: 1 ♀, nr Birganj, Lothar, 450 ft, 1—5 Sept., 1967.

The first gastral tergite is red, as in the females from Bali. The tips of the mandibles is worn off, so that the apex seems to be bidentate instead of tridentate, besides the larger inner tooth.

I could not find any difference of importance between the type of *Psen puncticeps* Cameron (1907), which is in the collection of the British Museum (Natural History), and a female from Java, which I considered to belong to *Psenulus antennatus* Rohwer (1923). Cameron's description of *Psen puncticeps* is somewhat misleading. The gaster is not "piceous", but dark red, somewhat discoloured. The propodeum shows the same enclosed area as *P. antennatus*, Cameron describing the "metanotum" as "without a basal area".

The mandibles are quadridentate, as is characteristic for the females of *P. antennatus* from Java and Bali. The punctuation of the scutum is slightly stronger than in these females.

The type does not originate from Simla, as stated by Cameron, but from Bombay and is labelled "Type" (printed on small round label), "Matheran 3.99" (typewritten), "Col. C. G. Nurse Collection 1920—72" (printed), "*Psen puncticeps* Cam. Type Bombay" (probably in Cameron's handwriting), and "B.M. Type Hym. 21.819".

Unfortunately *P. antennatus* was described by Rohwer after a single male from Singa-

pore and but for another male I have seen no further material from Malaya. However, I could compare this latter male with series of females and males from Java and Bali and I think that there is no doubt that *P. antennatus* Rohwer is a synonym of *P. puncticeps* Cameron.

Psenulus godavariensis spec. nov.

Male. — Head and thorax black; underside of antennae, mandibles, except dark tips, and palpi yellowish. Dorsal side of pronotum, except darkened sides, a narrow anterodorsal margin and pronotal tubercles yellowish-white. Tegulae yellowish-red. Metanotum yellow with ill-defined brownish area in the middle. Fore and mid legs yellow, trochanters paler, underside of fore and mid femora brownish. Base of hind coxae on fore side with brown spot. Hind legs including trochanters yellowish-red, tarsi brown with paler apices. Veins of wings dark brown. Gaster including complete petiole yellowish-red. Apical spine dark brown.

Clypeus convex, median part of depressed apical margin with two small teeth; distance between tips of teeth about one sixth of total distance there between the eyes. Fine frontal carina, raised part between antennae narrow, ending below antennae in a transverse carina with ends curved upwards to outer side of antennal sclerites. Frons below anterior ocellus with fine and dense, but superficial, punctation, vertex with only a few punctures. Tempora and genae shining, with very fine piliferous punctures. Antennal segments long, 3—12 about two and a half times as long as broad at apex, last segment nearly three times as long as broad at base. No tyloidea.

Scutum with irregular, fine, also with many larger and a few much larger punctures, very fine and dense punctation between median lines. Prescutal sutures distinct, about one third length of scutum. Parapsidal sutures distinct, posteriorly ending in a small pit. Scutellum and metanotum almost impunctate, lateral depressions normal. Enclosed area of propodeum depressed, with oblique carinae, median two carinae diverging, longitudinal sulcus broad and with a few transverse carinae above, narrow on back of propodeum. Surface of propodeum smooth behind enclosed area, basal two thirds of back and sides with coarse reticulate carination but finer than in *P. birganjensis*. Mesopleura, metapleura and anterior margin of sides of propodeum shining, mesopleura, ventral side of thorax and anterior plate of mesepisternum with a few fine punctures. Anterior oblique suture foveolate, widened upper part shining, without transverse carinae. First recurrent vein of fore wings interstitial, second recurrent vein ending in third submarginal cell. Lower side of second submarginal cell about one and a half times as long as upper side. Legs normal, slender. Petiole about as long as first gastral tergite, almost cylindrical, dorsally somewhat flattened, a small elongate-triangular groove at apex. Gaster shining, very finely punctate, apical margins of tergites smooth. Sternites 3—6 finely aciculate.

Pubescence of face silvery, mostly appressed, head and thorax with greyish-white pubescence, partly long, dense on mesosternum. Pubescence of gaster yellowish-golden, a few long stiff hairs before apical margin of sternites, sixth sternite with dense, backwards directed, golden pubescence.

Length, including apical spine, 7 mm.

Genitalia: Fig. 35, 36 and 37.

Female unknown.

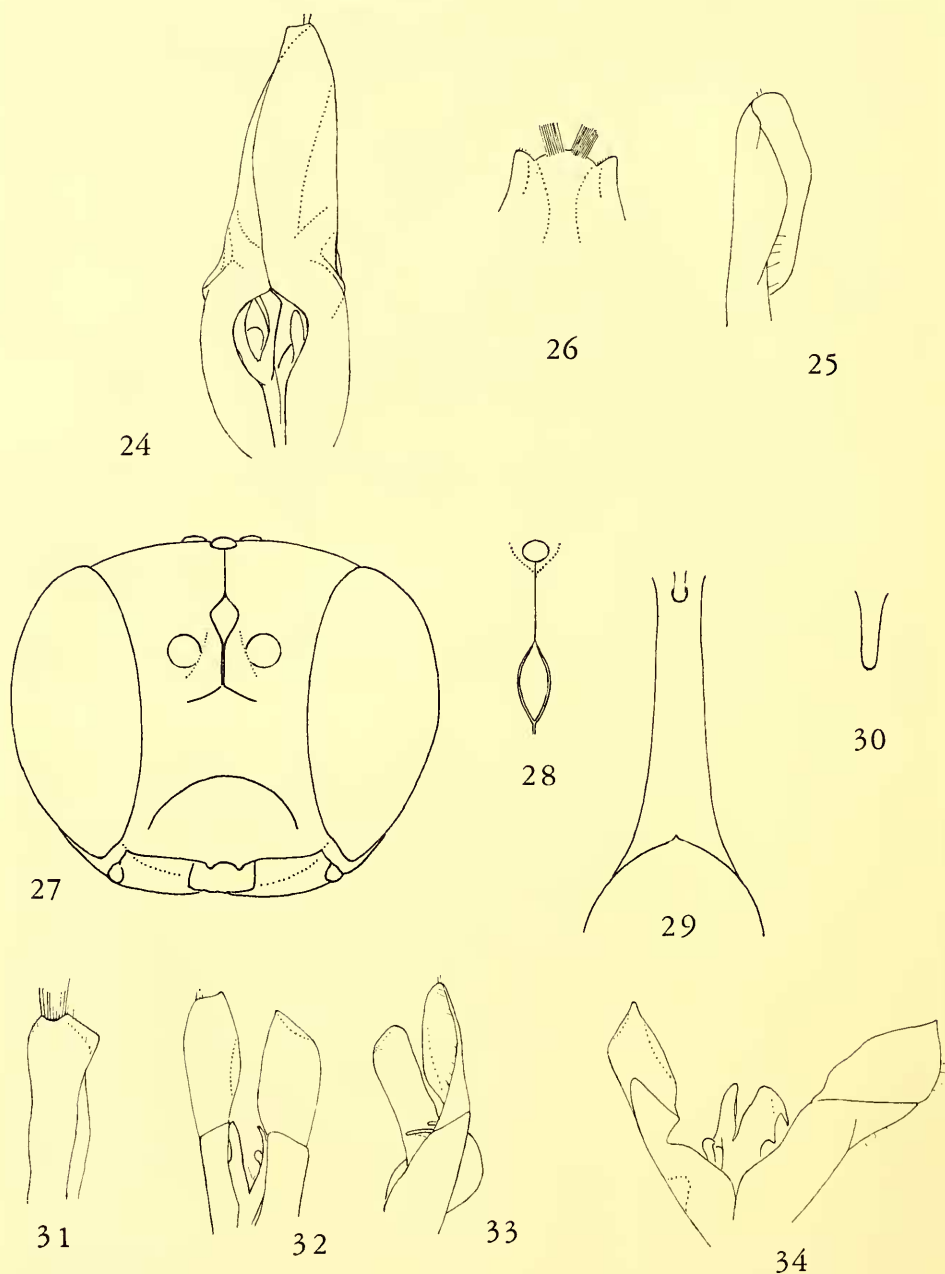


Fig. 24—26. *Psenuus quadridentatus* Van Lith, ♂, Nepal. 24, genitalia, dorsal aspect; 25, apex of left stipes, ventral aspect; 26, apex of seventh sternite. Fig. 27—33. *Psenuus chillcotti* sp. nov., ♀, holotype, ♂, allotype. 27, face, ♀; 28, median ocellus and interantennal carina, dorsal aspect, ♀; 29, petiole, ♀; 30, pygidial area, ♀; 31, apex of seventh sternite, ♂; 32, ♂ genitalia, dorsal aspect; 33, the lateral aspect. Fig. 34. *Psenuus chillcotti* sp. nov., aberrant (?) ♂, genitalia, dorsal aspect

Nepal: 1 ♂ (holotype), Kathmandu, Godavari, 6000 ft, 20—22 July, 1967, Malaise trap.

P. godavariensis belongs to the group of *P. interstitialis* Cameron and is probably closely related to *P. ornatus* (Ritsema), *P. birganjensis* sp. nov., *P. kankauensis* Strand (1915) and *P. pembuchiensis* Tsuneki (1971). In view of the marking and the stronger punctate scutum it is considered here provisionally as a separate species.

***Psenulus birganjensis* spec. nov.**

Male. — Head and thorax black, with metallic reflections; the following parts are yellow: mandibles except dark tips, labrum, palpi, pronotum anterodorsally and dorsally, pronotal tubercles, tegulae, two narrow longitudinal lines (which may be lacking) on scutum, broadened posteriorly and neither reaching anterior nor posterior margin, axillae, scutellum including posterolateral margins but except a large vague circular brown spot in the middle, metanotum including postero-lateral margins, four separate elongate marks on propodeum. Anterior margin of clypeus brownish. Scape of antennae yellow, underside of flagellum pale yellowish-brown. Tips of all coxae, whole tibiae and tarsi of fore and mid legs yellow; trochanters and femora of fore and mid legs dorsally yellow, underside brown; hind legs reddish, greater part of trochanters and outer side of femora brown. Veins of wings dark brown. Petiole pale yellowish-red, apical third dark brown, gaster including ventral plate of petiole orange-red. Apical spine dark brown.

Protruding median part of anterior margin of clypeus slightly emarginate, disk dull, superficially punctate. Fine frontal carina, raised part between antennae narrow, ending below antennae in a high transverse carina. Frons and vertex smooth. Antennae long, in frontal aspect third segment about two and a third times, segments 4—12 more than twice as long as broad at apex, last segment about three times as long as broad at base. Segments 3—5 thicker, following segments gradually tapering, segments 6—11 somewhat convex below. No tyloidea.

Scutum and scutellum with very fine punctures, from which fine hairs arise, interstices a few times diameter of punctures, and very few larger punctures. Metanotum with more numerous fine hair-bearing punctures. Enclosed area of propodeum triangular, with distinct oblique carinae, behind enclosed area on both sides a large smooth area, back and sides of propodeum with reticulate, moderately strong carination. Meta-, mesopleura, anterior plate of mesepi- and mesosternum shining, only with minute hair bearing punctures. Anterior oblique suture foveolate, widened upper part with transverse carinae. First recurrent vein of fore wings ending just in second submarginal cell, second recurrent vein ending in third submarginal cell. Upper side of second submarginal cell about half the length of the underside. Legs rather slender. Petiole cylindrical, not reaching as far as end of hind femora. Gaster very finely punctate, dorsally smooth, ventrally finely alutaceous.

Face with appressed silvery pubescence and also with long silvery-white erect hairs. Hairs on head and thorax long, rather dense, yellowish-grey, on gaster shorter and more yellowish, hind margins of sternites with long stiff hairs, sixth sternite with dense yellowish pubescence.

Genitalia (Fig. 38) resembling those of *P. interstitialis*, pale straw-yellow, including volsellae. Apex seventh sternite and apical spine: Fig. 39.

Length, 8.5—9 mm.

Female unknown.

Nepal: 1 ♂ (holotype), near Birganj, Lothar, 450 ft, 5—12 Sept., 1967, Malaise trap No. 32; 1 ♂ (paratype), same locality, 12—19 Sept., 1967.

This form is provisionally placed in the group of *P. interstitialis* Cameron. Its colour pattern closely resembles that of *P. ornatus* (Ritsema, 1876) from Java, of which only one male is known. *P. birganjensis* differs by the yellow axillae and the shorter antennal segments, segments 4—12 being about twice as long as broad, in *P. ornatus* about two and a half times.

Psenulus pulcherrimus (Bingham)

Bingham, 1896: 443, ♀ (*Psen pulcherrimus*; Tenasserim).

Bingham, 1897: 263.

Van Lith, 1962: 101 (*Psenulus pulcherrimus*).

Van Lith, 1969: 200, ♂ (Vietnam).

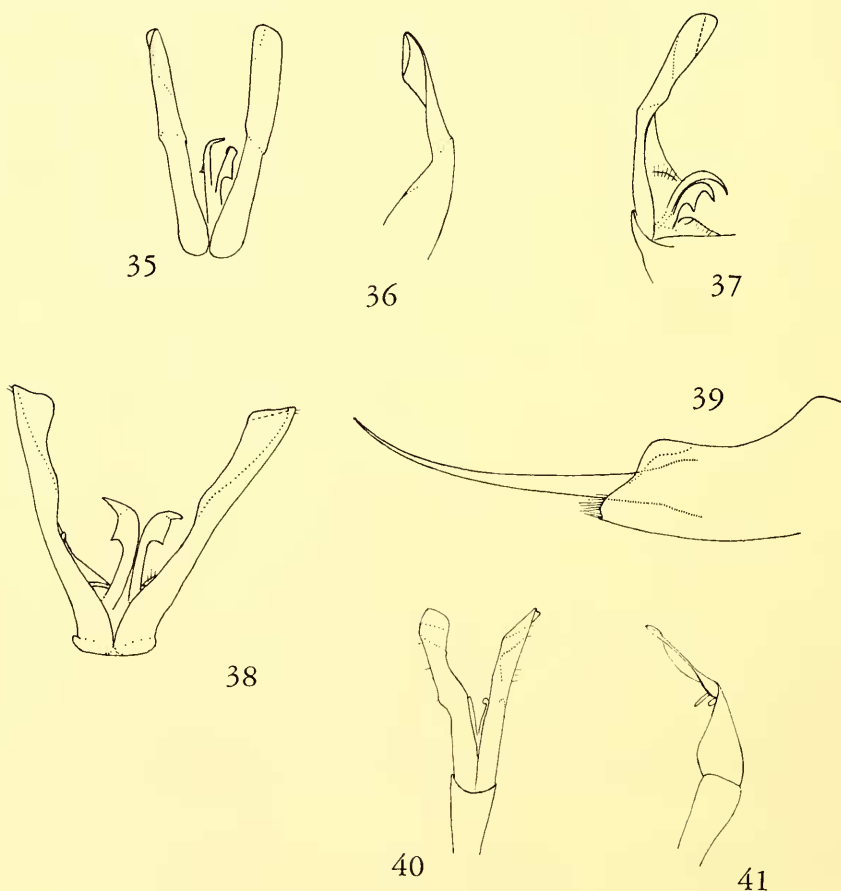


Fig. 35—37. Genitalia of male of *Psenulus godavariensis* sp. nov., holotype. 35, dorsal aspect; 36, right stipes, lateral aspect; 37, right stipes and penis valves, latero-dorsal aspect

Fig. 38—39. *Psenulus birganjensis* sp. nov., ♂, holotype. 38, genitalia, dorsal aspect; 39, apices of seventh and eighth sternites, lateral aspect

Fig. 40—41. *Psenulus pulcherrimus* (Bingham), Nepal. 40, ♂ genitalia, dorsal aspect; 41, the same, lateral aspect

A fine series of two females and seven males was collected. They differ from the nominate subspecies from Tenasserim (female, holotype) and Vietnam (male) only in having more completely, and darker, brown hind femora and the base of the first gastral tergite more or less darkened.

The marking of the scutum is variable. The female and two males collected near Birganj have only a median yellow spot on the scutum, in the female even somewhat reduced. The single female and two out of the five males from Simra have in addition a smaller or larger yellow mark along the tegulae, as in the two sexes from Tenasserim and Vietnam. Also the marking of the scutellum varies, but it covers at least the apical half. Propodeum with the same two large yellow marks as in the holotype, with which I could compare.

Genitalia of male: Fig. 40 and 41.

Nepal: 1 ♀ and 5 ♂, near Simra, Adhabhar, 600 ft, 23—28 Aug., 1967, Malaise traps No. 21, 23 and 24; 1 ♀ and 1 ♂, near Birganj, Lothar, 450 ft, 29 Aug.—5 Sept., 1967, Malaise traps No. 25 and 28, and 1 ♂, same locality, 5—12 Sept., 1967.

This series is interesting, not only because of the relatively great number of specimens from two localities, but also because of the great variability of the yellow marking of the scutum. It may represent a new geographical subspecies, the femora being darker brown and the first gastral tergite being darkened in all specimens. However, in view of the variability of the Nepalese populations and the scarcity of the material from other regions in southern Asia, I hesitate to name this form.

P. pulcherrimus eburneus Van Lith (1969), from Bengal, differs by the much paler yellow marking, the completely red first gastral tergite and the four, instead of two, marks on the propodeum.

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